

Explosive Resistant Coating

Purpose: To conduct experimentation with various poly-urea materials categorized as Explosive Resistant Coatings (ERC) to determine how effectively these coatings improve the protection of personnel from ballistic and blast threats when ERC is applied to armor substrates.

Background: The Marine Corps requires optimum personnel protection from Improvised Explosive Devices (IEDs) within the constraints of armor material availability, and the capacity of vehicles to carry parasitic armor while remaining mission capable. The Lab examined ERC and determined that when applied to substrates with hardness equal to, or greater than, High Hard Steel (HHS) the added protection level is cost effective. The added weight per square foot from ERC is less than the weight penalty from thicker steel armor. For example $\frac{1}{2}$ to $\frac{3}{4}$ inch ERC on the exterior of $\frac{3}{16}$ ths HHS equals the protective qualities of $\frac{3}{8}$ ths inch Rolled Homogeneous Armor (RHA), and weighs approximately 2.3 lbs less per square foot. Achieving such positive results will reduce the weight of parasitic armor on vehicles, thereby increasing operational availability of vehicles in OIF.



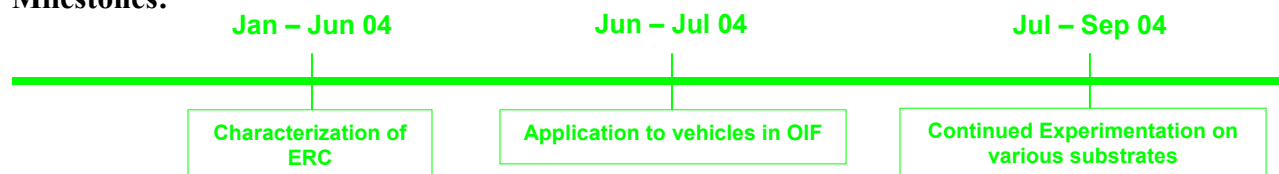
Additionally, the armor coating process is relatively straightforward, cost effective, and can be applied in a field environment with minimal training.

Description: ERC is produced by mixing a 1:1 ratio of two components: 1) an isocyanates quasi-prepolymer and a resin bond. ERC is sprayed onto surfaces and dries in 6 to 12 seconds.

Deliverable Product(s): The Lab in conjunction with Naval Surface Warfare Command, Dahlgren, Naval Surface Warfare Command, Carderock, and Army Research Laboratory has fully characterized the properties of ERC when applied to $\frac{3}{16}$ ths inch HHS. The Lab, Marine Corps Logistics Command, and MCSC have developed an integrated solution for upgrading all $\frac{3}{16}$ ths inch HHS in OIF using ERC to achieve a level of protection equal to $\frac{3}{8}$ ths inch RHA.

The Lab is experimenting with ERC in combination with ceramic materials to further learn its potential for armor applications; specifically, semi-permanent and permanent blast shields, buildings, walls, and checkpoint protective barriers.

Milestones:



Action Officer: 784-3425